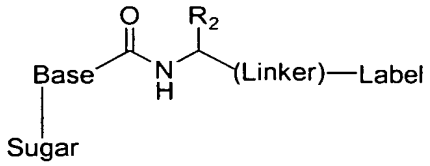
What is claimed is:

1. A compound of formula (I):

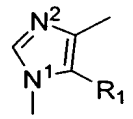


I

alone or in combination with a counterion thereof or a stable salt, solvate, clathrate or mixture thereof, wherein:

sugar is a ribose, deoxyribose, or ribose sugar analog;

base is



wherein sugar is covalently bonded to N^1 of the base;

wherein R_1 is $-NHC(O)NH_2$, $-NH_2$, -OH, (alkyl), alkyl, CO_2H;

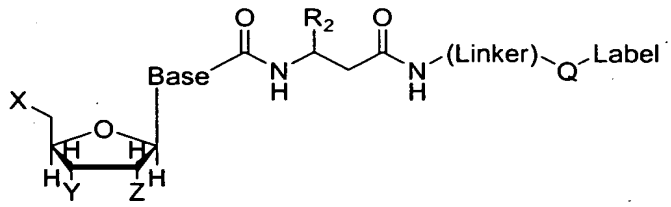
wherein R_2 is -H or alkyl;

linker is $(CH_2CH_2O)_n$, $(CH_2O)_n$, or $(CH_2)_n$;

wherein n is an integer from 1 to 30; and

label is a colorimetric compound, a chemiluminescent compound, a bioluminescent compound, a fluorescent compound a non- or weakly fluorescent compound, or a quencher.

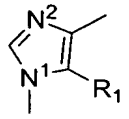
2. A compound of formula II:



II

alone or in combination with a counterion thereof or a stable salt, solvate, clathrate or mixture thereof, wherein:

base is

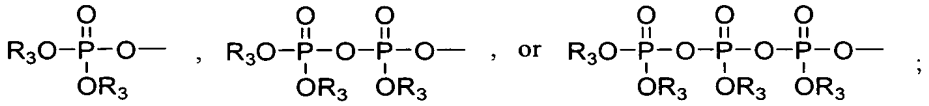


wherein sugar is covalently bonded to N^1 of the base;

wherein R_1 is -$NHC(O)NH_2$, -H, -NH_2, -OH, -O(alkyl), alkyl, or CO_2H;

wherein R_2 is -H or alkyl;

each of X, Y, and Z is independently H, -OH, -O-alkyl, -SH, -SR_4, -NHR_4, -NR_4R_5,



wherein R_3 is -H or metal;

R_4 is -H or alkyl;

R_5 is -H or alkyl;

linker is $(CH_2CH_2O)_n$, $(CH_2O)_n$ or $(CH_2)_n$;

wherein n is an integer from 1 to 30;

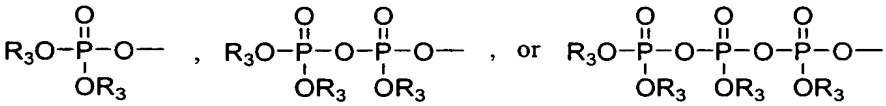
Q is O, S, or NH; and

label is a colorimetric compound, a chemiluminescent compound, a bioluminescent compound, a fluorescent compound, a non- or weakly fluorescent compound, or a quencher.

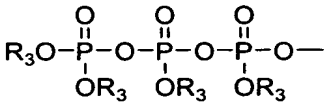
3. The compound of claim 2, wherein at least one of X, Y, and Z is -OH.

4. The compound of claim 2, wherein each of X, Y, and Z is -OH.

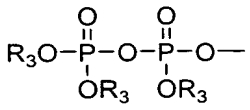
5. The compound of claim 2, wherein at least one of Y and Z is -OH and X is



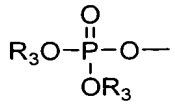
6. The compound of claim 2, wherein X is



7. The compound of claim 2, wherein X is



8. The compound of claim 2, wherein X is



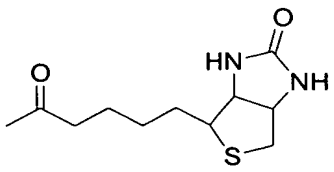
9. The compound of claim 2, wherein R_1 is -NHC(O)NH_2.

10. The compound of claim 2, wherein the linker is $(CH_2CH_2O)_n$, wherein n is an integer between 1 and 10.

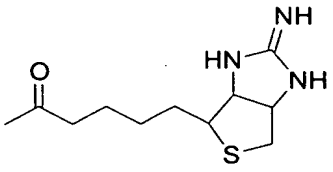
11. The compound of claim 2, wherein the label is biotin, a biotin derivative or a fluorophore.

12. The compound of claim 2, wherein the fluorophore is fluorescein, tetrachlorofluorescein, hexachlorofluorescein, a non or weakly fluorescent compound, Cy3, Tetramethylrhodamine, Cy3.5, Carboxy-x-rhodamine, Texas Red, Cy5, Cy5.5, phycoerythrins, or allophycocynanins.

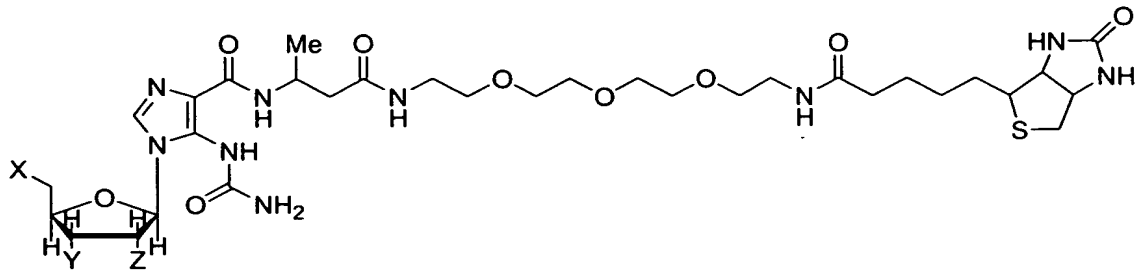
13. The compound of claim 2, wherein the label is



or

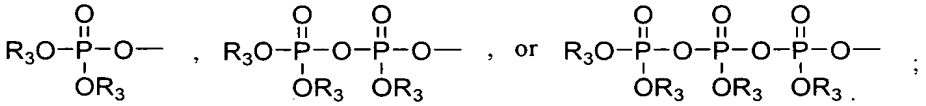


14. A compound of formula III:



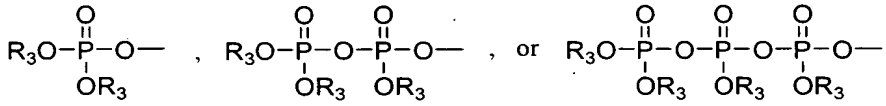
III

alone or in combination with a counterion thereof or a stable salt, solvate, clathrate or mixture thereof, wherein each of X, Y, and Z is independently -H, -OH, -O(alkyl), -SH, $-SR_4$, $-NHR_4$, $-NR_4R_5$,



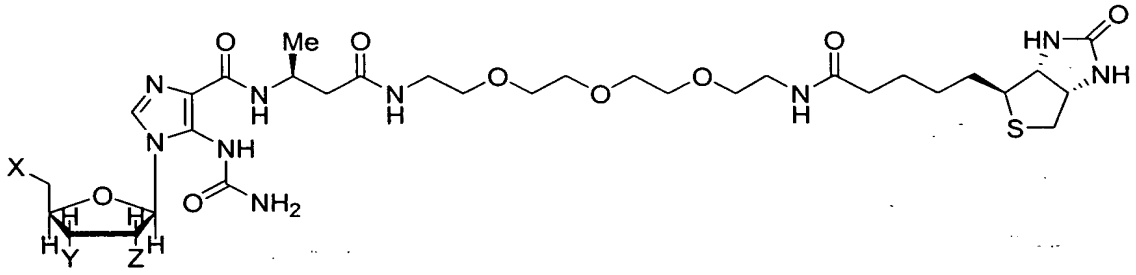
wherein R_3 is -H or metal; R_4 is -H or alkyl; and R_5 is -H or alkyl.

15. The compound of claim 14, wherein X, Y, and Z are independently -H, -OH,



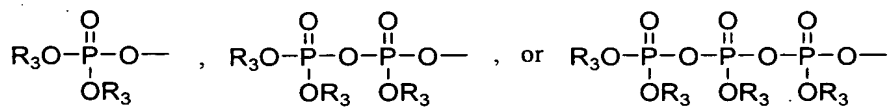
16. The compound of claim 14, wherein the compound is stereomerically pure.

17. A compound of formula IV:



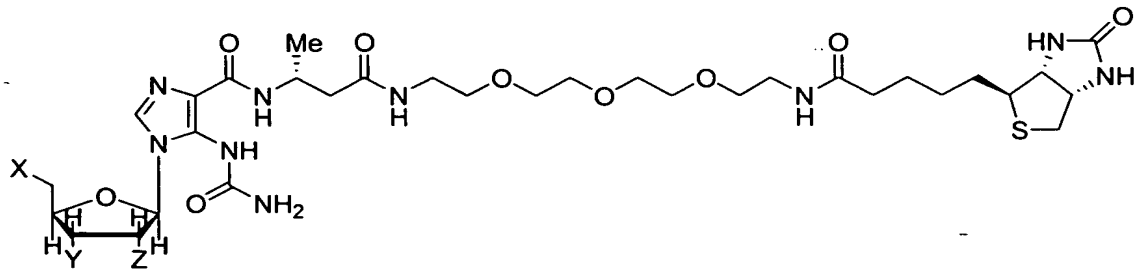
IV

wherein X, Y, and Z are independently H, OH,



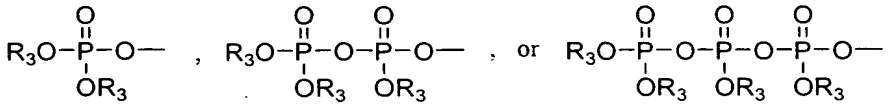
wherein R_3 is H or metal.

18. A compound of formula V:



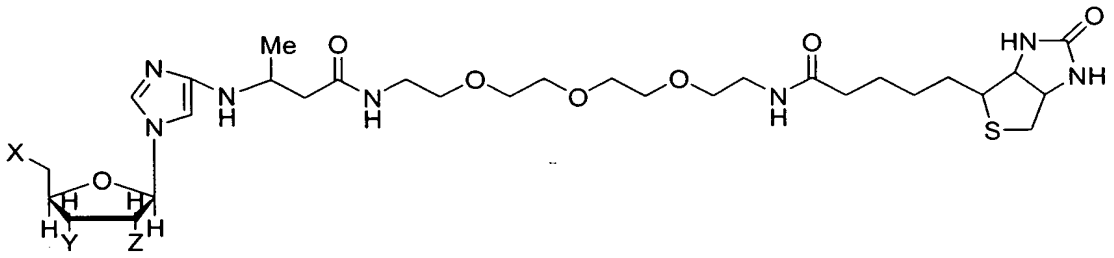
V

wherein X, Y, and Z are independently H, OH,



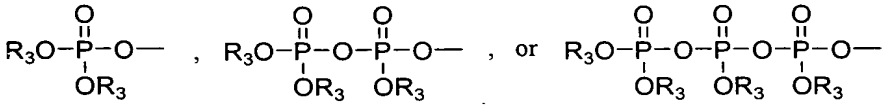
wherein R_3 is H or metal.

19. A compound of formula VI:



VI

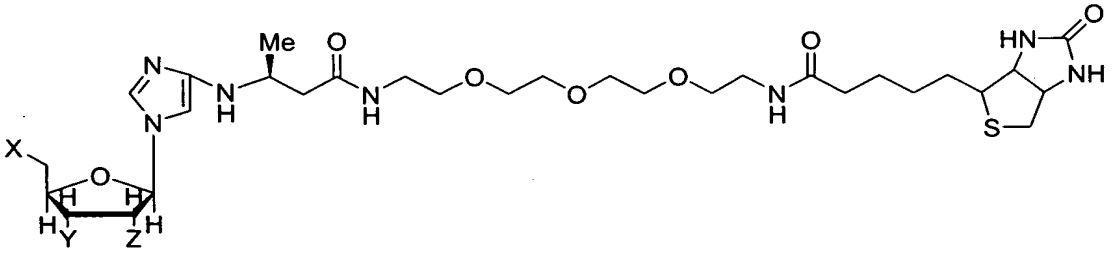
wherein X, Y, and Z are independently H, OH,



wherein R_3 is H or metal.

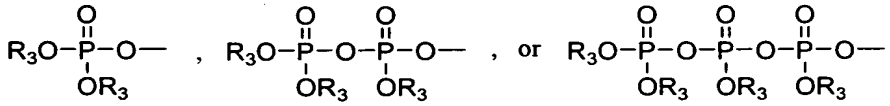
20. The compound of claim 19, wherein the compound is stereomerically pure.

21. A compound of formula VII:



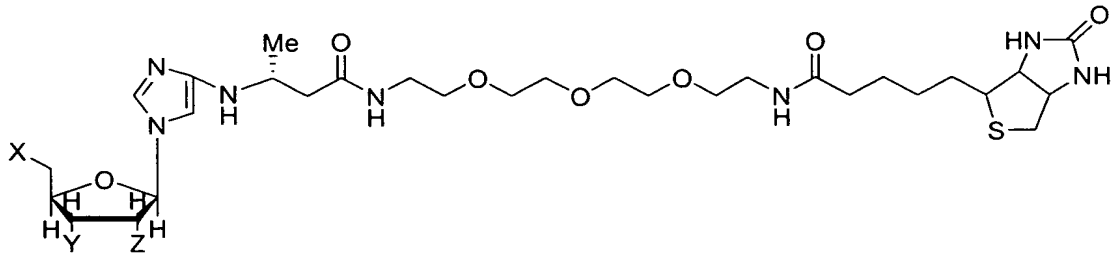
VII

wherein X, Y, and Z are independently H, OH,



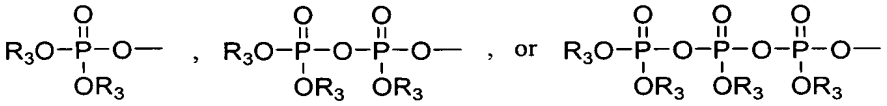
wherein R_3 is H or metal.

22. A compound of formula VIII:



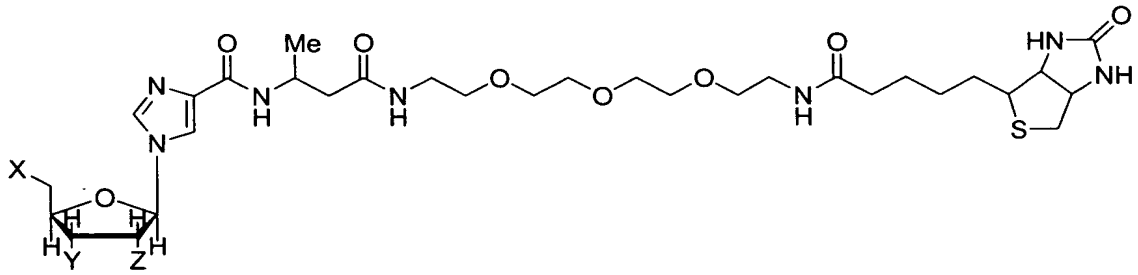
VIII

wherein X, Y, and Z are independently H, OH,



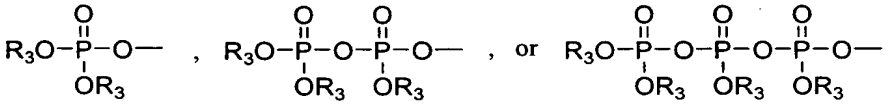
wherein R_3 is H or metal.

23. A compound of formula IX:



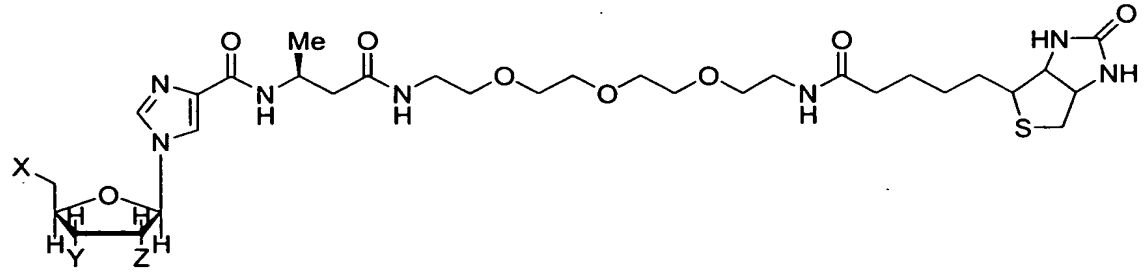
IX

wherein X, Y, and Z are independently H, OH,



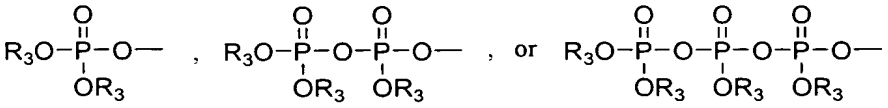
wherein R_3 is H or metal.

24. A compound of formula X:



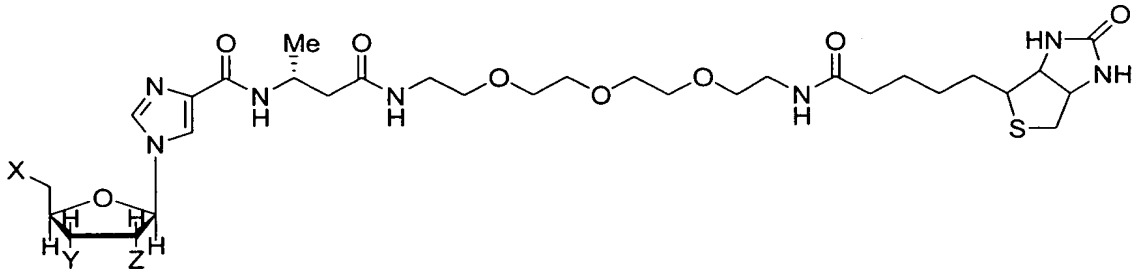
X

wherein X, Y, and Z are independently H, OH,



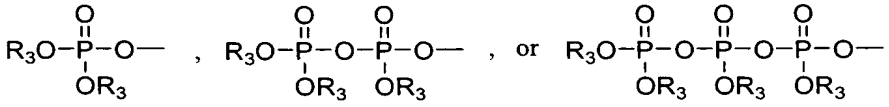
wherein R_3 is H or metal.

25. A compound of formula XI:



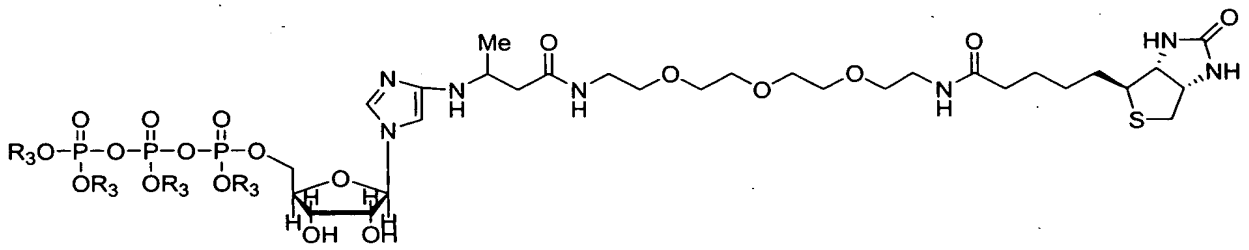
XI

wherein X, Y, and Z are independently H, OH,



wherein R_3 is H or metal.

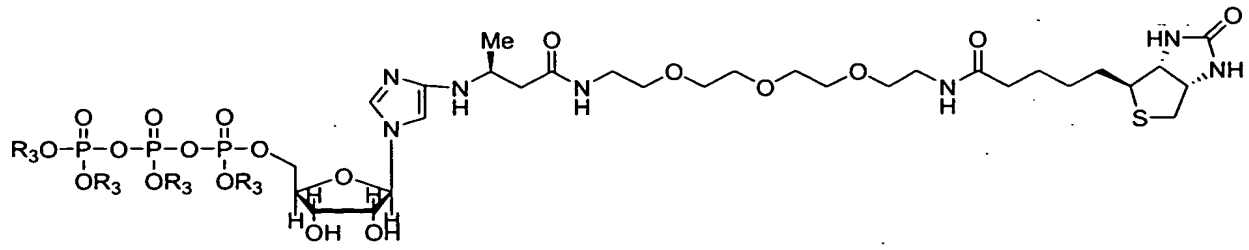
26. A compound of formula XII:



XII

wherein R_3 is H or metal.

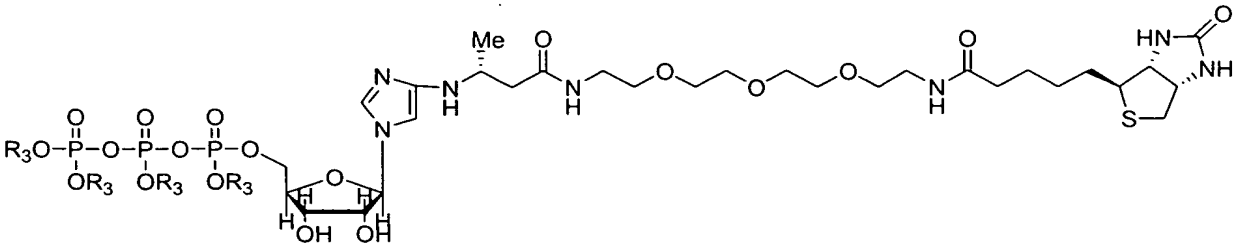
27. A compound of formula XIII:



XIII

wherein R_3 is H or metal.

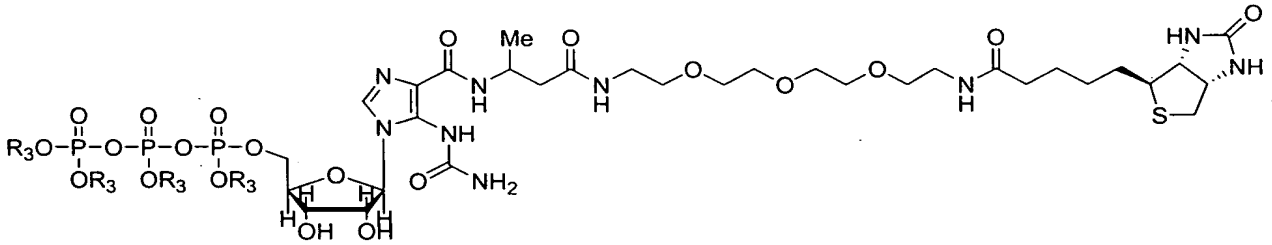
28. A compound of formula XIV:



XIV

wherein R_3 is H or metal.

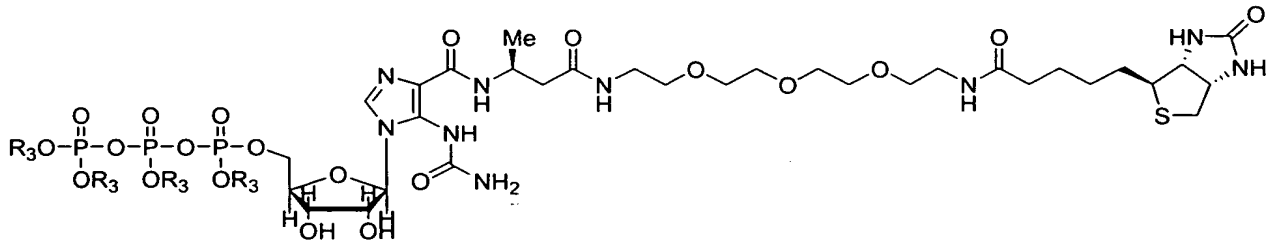
29. A compound of formula XV:



XV

wherein R_3 is H or metal.

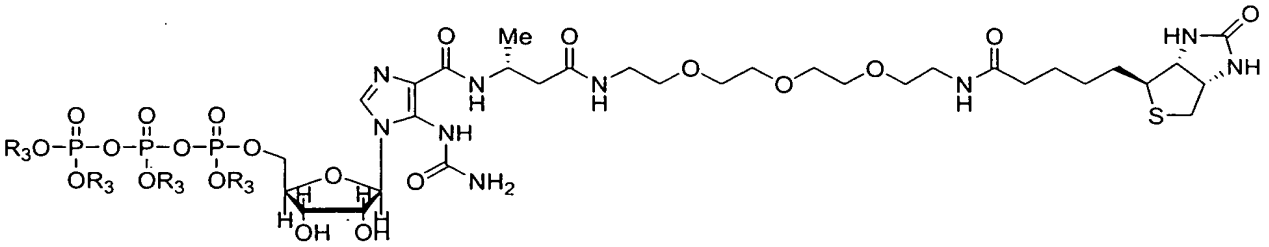
30. A compound of formula XVI:



XVI

wherein R_3 is H or metal.

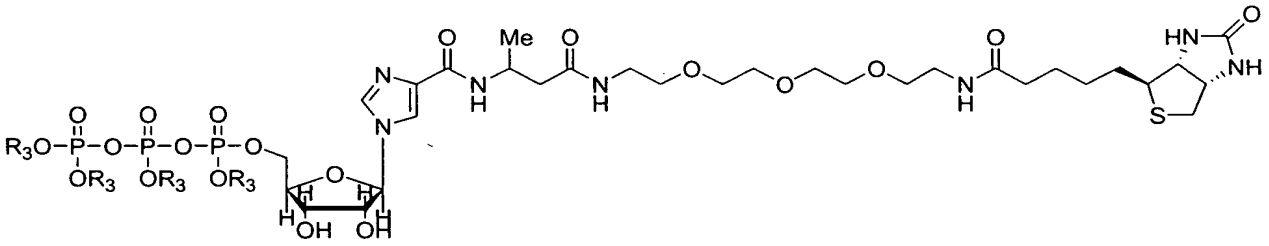
31. A compound of formula XVII:



XVII

wherein R_3 is H or metal.

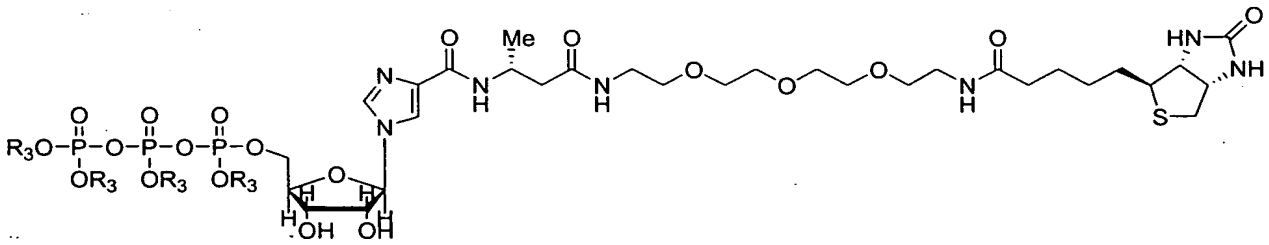
32. A compound of formula XVIII:



XVIII

wherein R_3 is H or metal.

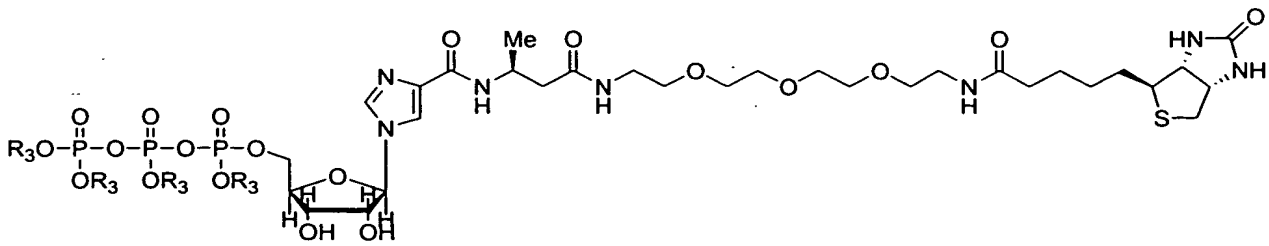
33. A compound of formula XIX:



XIX

wherein R_3 is H or metal.

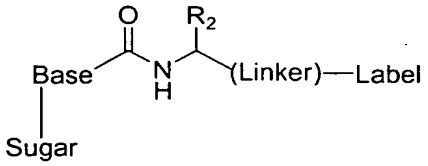
34. A compound of formula XX:



XX

wherein R_3 is H or metal.

35. An oligonucleotide comprising a detectable label of formula (XXI):

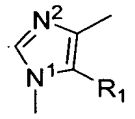


XXI

alone or in combination with a counterion thereof or a stable salt, solvate, clathrate or mixture thereof, wherein:

sugar is a ribose, deoxyribose or a ribose sugar analog;

base is



wherein sugar is covalently bonded to N^1 of the base;

wherein R_1 is $-NHC(O)NH_2$, -H, $-NH_2$, -OH, -O(alkyl), alkyl, or CO_2H;

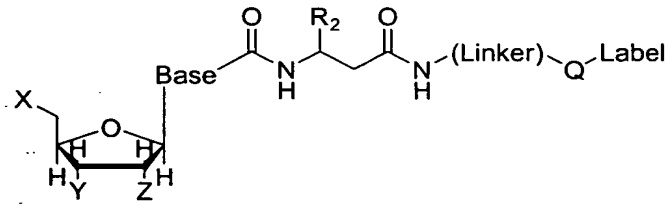
wherein R_2 is -H or alkyl;

linker is $(CH_2CH_2O)_n$, $(CH_2O)_n$ or $(CH_2)_n$;

wherein n is an integer from 1 to 30; and

label is a colorimetric, chemiluminescent, bioluminescent, a fluorescent compound, a non- or weakly fluorescent compound, or a quencher.

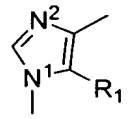
36. An oligonucleotide comprising a detectable label of formula XXII:



XXII

alone or in combination with a counterion thereof or a stable salt, solvate, clathrate or mixture thereof, wherein:

base is

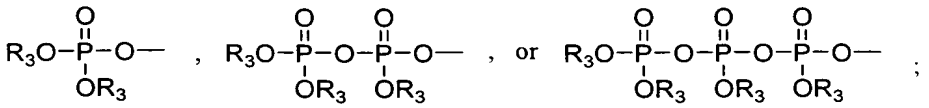


wherein sugar is covalently bonded to N^1 of the base;

wherein R_1 is -NHC(O)NH_2, -H, -NH_2, -OH, -O(alkyl), alkyl, or CO_2H;

wherein R_2 is -H or alkyl;

each of X, Y, and Z is independently -H, -OH, -O(alkyl), -SH, -SR_4, -NHR_4, -NR_4R_5,



wherein R_3 is -H or metal;

R_4 is -H or alkyl;

R_5 is -H or alkyl;

linker is $(CH_2CH_2O)_n$, $(CH_2O)_n$ or $(CH_2)_n$;

wherein n is an integer from 1 to 30;

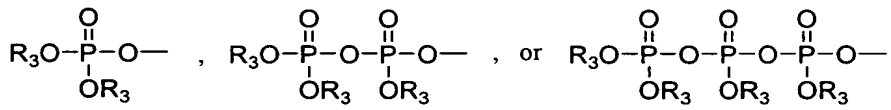
Q is O, S, or NH; and

label is a colorimetric, chemiluminescent, bioluminescent, a fluorescent compound, a non- or weakly fluorescent compound, or a quencher.

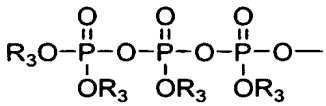
37. The oligonucleotide of claim 36, wherein at least one of X, Y, and Z is OH.

38. The oligonucleotide of claim 36, wherein each of X, Y, and Z is OH.

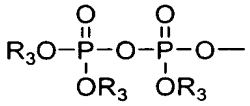
39. The oligonucleotide of claim 36, wherein at least one of Y and Z is OH and X is



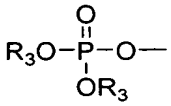
40. The oligonucleotide of claim 36, wherein X is



41. The oligonucleotide of claim 36, wherein X is



42. The oligonucleotide of claim 36, wherein X is



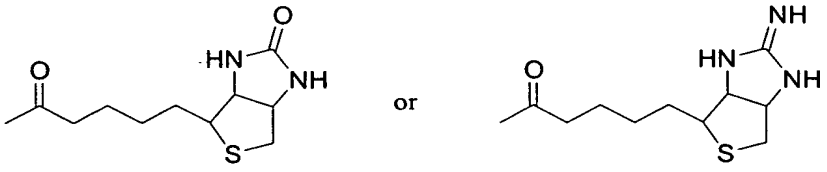
43. The oligonucleotide of claim 36, wherein R_1 is -NHC(O)NH_2.

44. The oligonucleotide of claim 36, wherein the linker is $(CH_2CH_2O)_n$, and wherein n is an integer from 1 to 10.

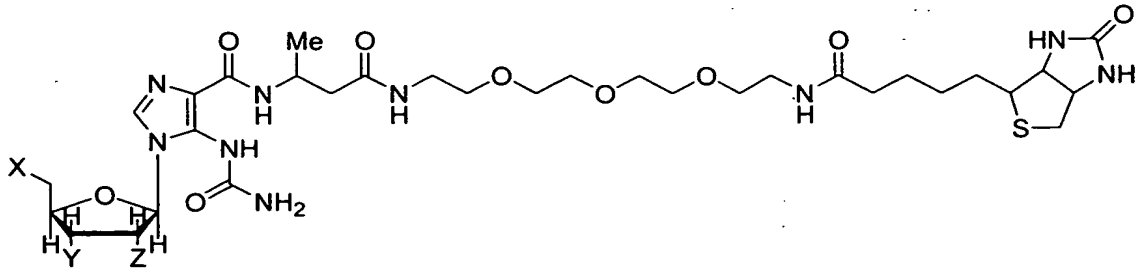
45. The oligonucleotide of claim 36, wherein the label is biotin, a biotin derivative or a fluorophore.

46. The oligonucleotide of claim 36, wherein the fluorophore is fluorescein, tetrachlorofluorescein, hexachlorofluorescein, a non or weakly fluorescent compound, Cy3, tetramethylrhodamine, Cy3.5, carboxy-x-rhodamine, Texas Red, Cy5, Cy5.5, phycoerythrin, or allophycocyanin.

47. The oligonucleotide of claim 36, wherein the label is

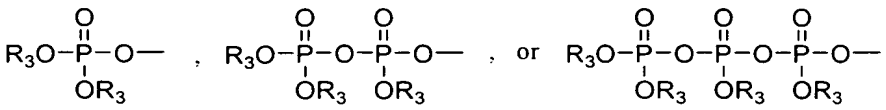


48. A detectable label of formula XXIII:



XXIII

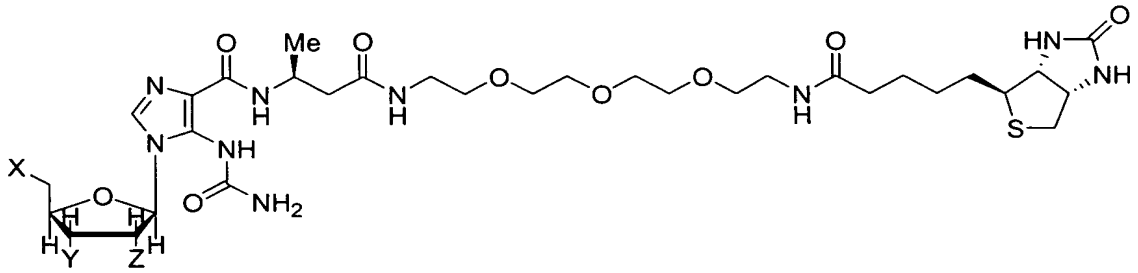
wherein X, Y, and Z are independently H, OH,



wherein R_3 is H or metal.

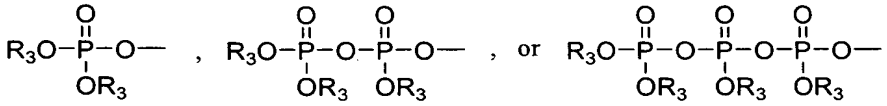
49. The detectable label of claim 48, wherein the detectable label is stereomerically pure.

50. A detectable label of formula XXIV:



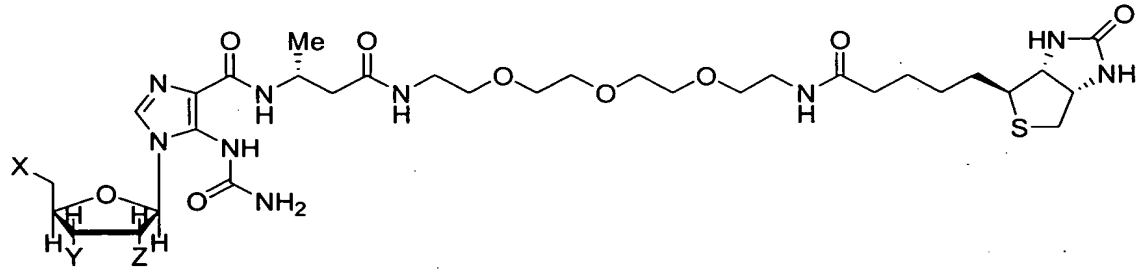
XXIV

wherein X, Y, and Z are independently H, OH,



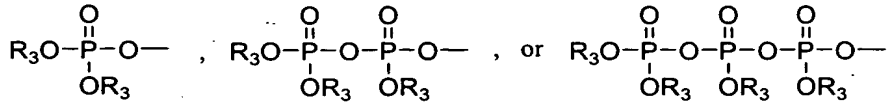
wherein R_3 is H or metal.

51. A detectable label of formula XXV:



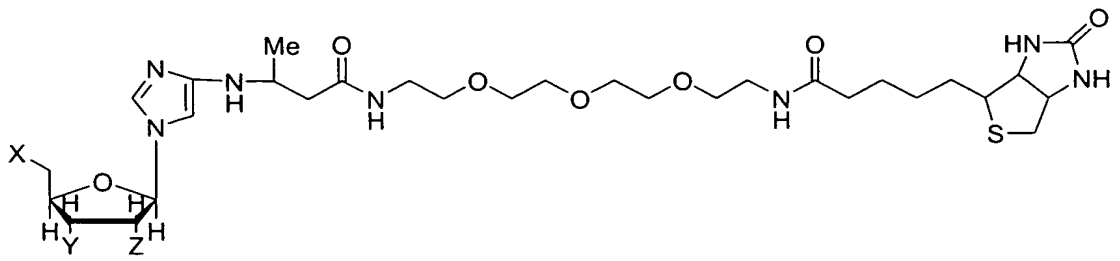
XXV

wherein X, Y, and Z are independently H, OH,



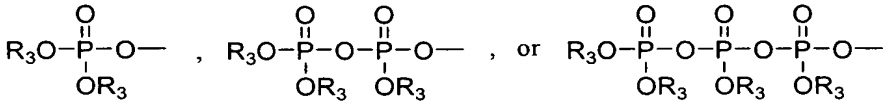
wherein R_3 is H or metal.

52. A detectable label of formula XXVI:



XXVI

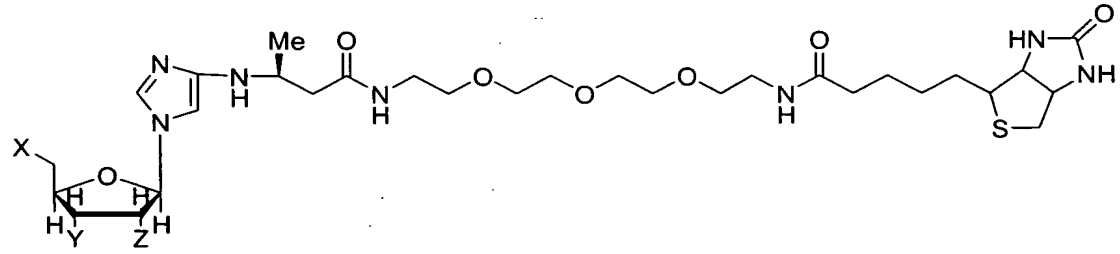
wherein X, Y, and Z are independently H, OH,



wherein R_3 is H or metal.

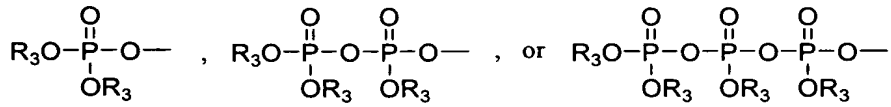
53. The detectable label of claim 36, wherein the detectable label is stereomerically pure.

54. A detectable label of formula:



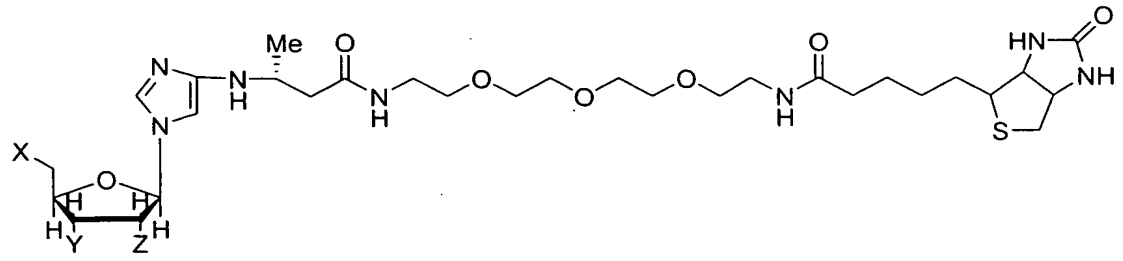
XXVII

wherein X, Y, and Z are independently H, OH,



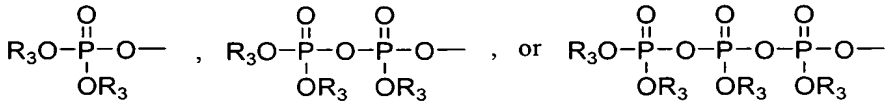
wherein R_3 is H or metal.

55. A detectable label of formula XXVIII:



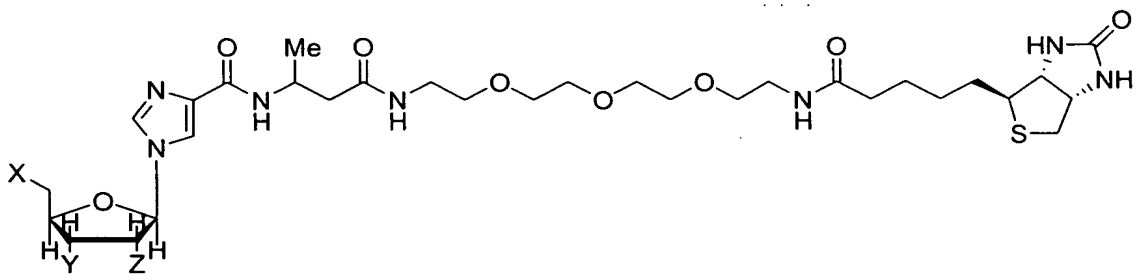
XXVIII

wherein X, Y, and Z are independently H, OH,



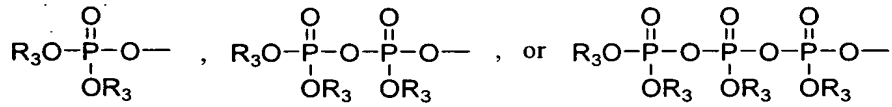
wherein R_3 is H or metal.

56. A detectable label of formula XXIX:



XXIX

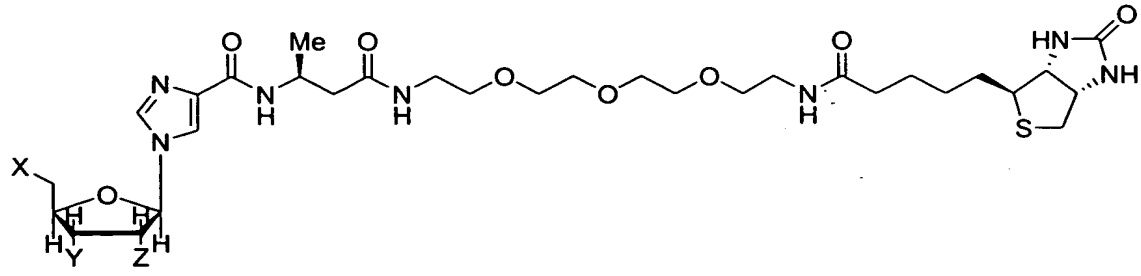
wherein X, Y, and Z are independently H, OH,



wherein R_3 is H or metal.

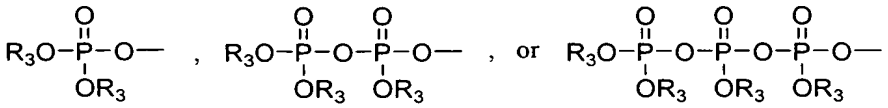
57. The detectable label of claim 56, wherein the label is stereomerically pure.

58. A detectable label of formula XXX:



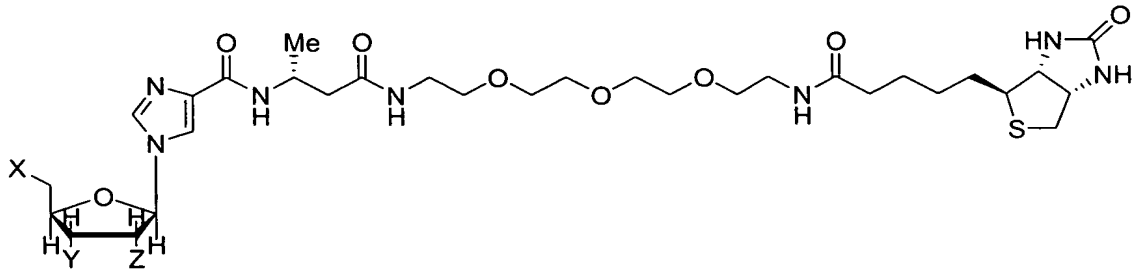
XXX

wherein X, Y, and Z are independently H, OH,



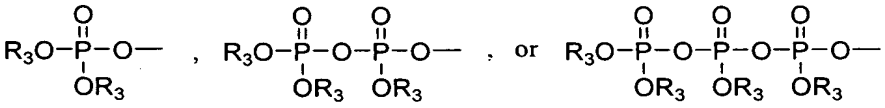
wherein R_3 is H or metal.

59. A detectable label of formula XXXI:



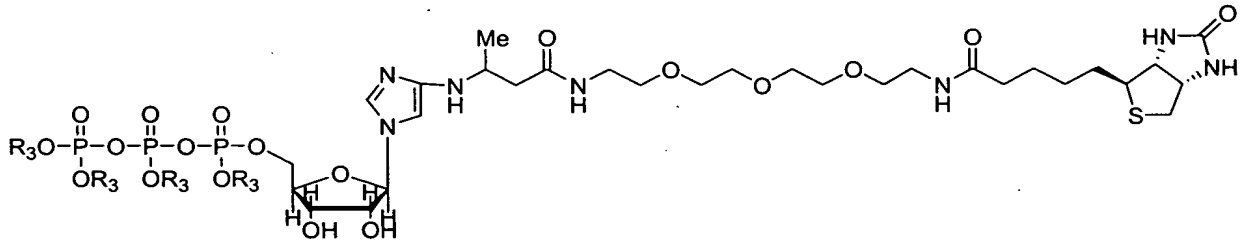
XXXI

wherein X, Y, and Z are independently H, OH,



wherein R_3 is H or metal.

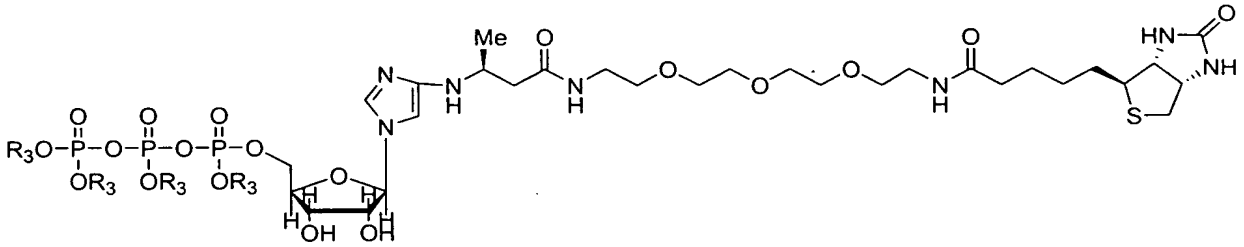
60. A detectable label of formula XXXII:



XXXII

wherein R_3 is H or metal.

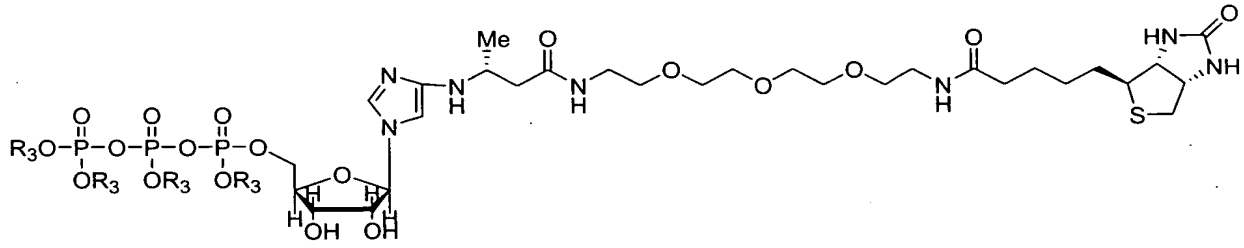
61. A detectable label of formula XXXIII:



XXXIII

wherein R_3 is H or metal.

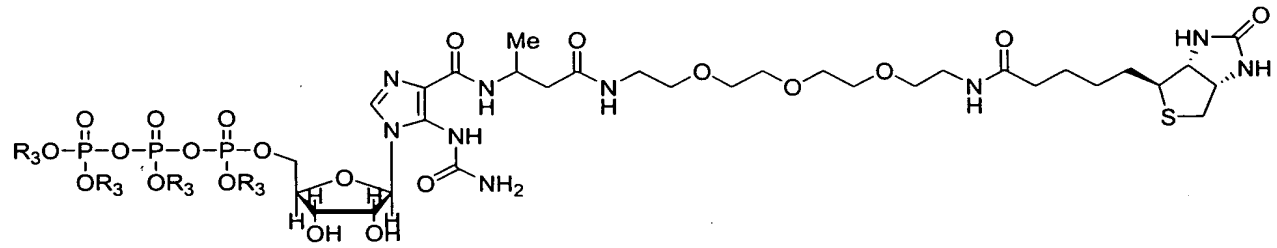
62. A detectable label of formula XXXIV:



XXXIV

wherein R_3 is H or metal.

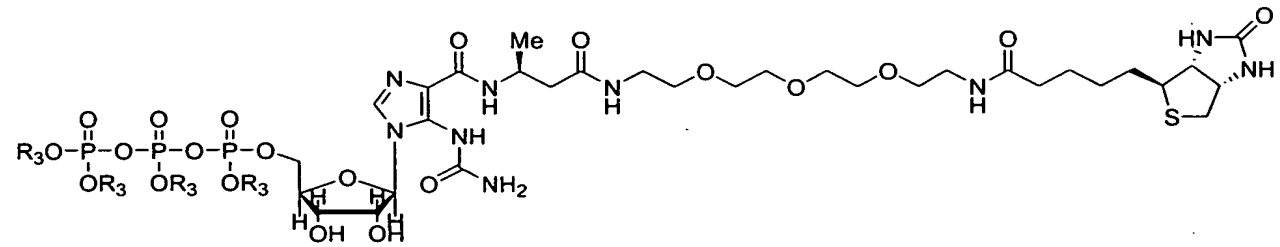
63. A detectable label of formula XXXV:



XXXV

wherein R_3 is H or metal.

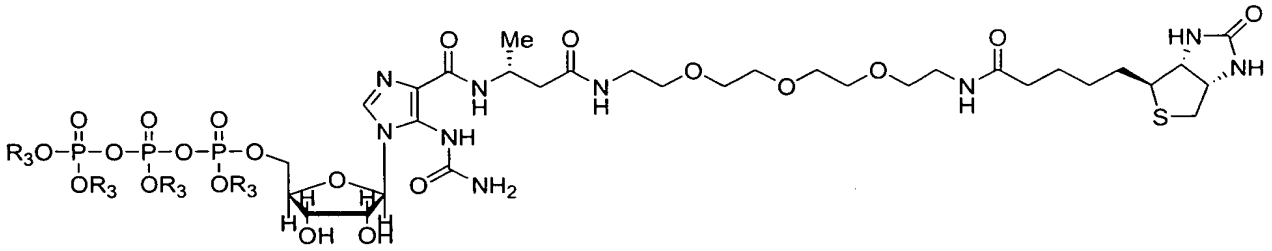
64. A detectable label of formula XXXVI:



XXXVI

wherein R_3 is H or metal.

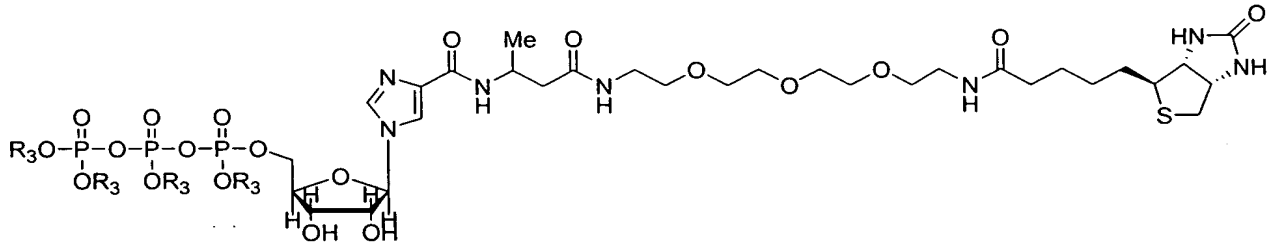
65. A detectable label of formula XXXVII:



XXXVII

wherein R_3 is H or metal.

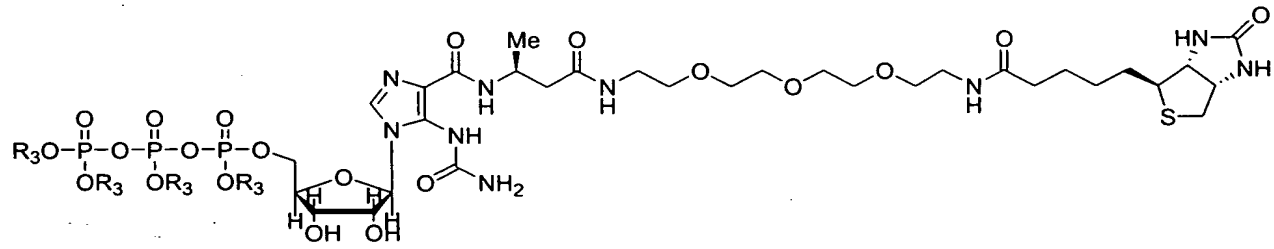
66. A detectable label of formula XXXVIII:



XXXVIII

wherein R_3 is H or metal.

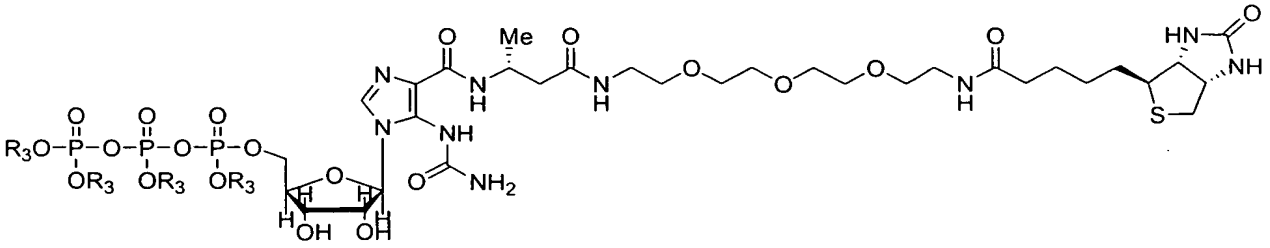
67. A detectable label of formula XXXIX:



XXXIX

wherein R_3 is H or metal.

68. A detectable label of formula XL:

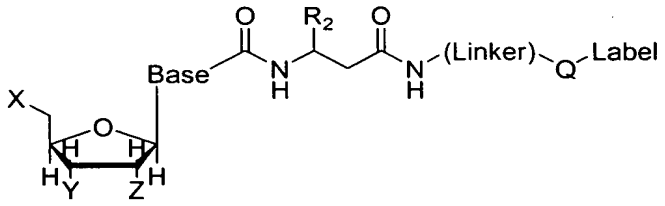


XL

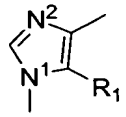
wherein R_3 is H or metal.

69. A method for detecting the presence or absence of a target nucleic acid in a test sample, comprising:

a) contacting the test sample with a composition comprising an oligo- or poly nucleotide probe wherein the oligo- or polynucleotide probe comprises a detectable label of formula:



base is

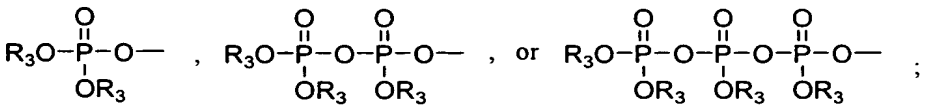


wherein sugar is covalently bonded to N^1 of the base;

wherein R_1 is $-NHC(O)NH_2$, -H, $-NH_2$, -OH, -O(alkyl), alkyl, or CO_2H;

wherein R_2 is -H or alkyl;

each of X, Y, and Z is independently -H, -OH, -O-alkyl, -SH, $-SR_4$, $-NHR_4$, $-NR_4R_5$,



wherein R_3 is H or metal;

R_4 is -H or alkyl;

R_5 is -H or alkyl;

linker is $(CH_2CH_2O)_n$, $(CH_2O)_n$ or $(CH_2)_n$;

wherein n is an integer from 1 to 30;

Q is O, S, or NH;

label is a colorimetric, chemiluminescent, bioluminescent, a fluorescent compound, or a non- or weakly fluorescent compound;

wherein the oligonucleotide probe is capable of selectively or specifically hybridizing with the target nucleic acid under conditions of moderate stringency; optionally exposing the sample to light of said excitable wavelength; and

b) detecting whether said contacting produces a change in color or fluorescence emission of the composition;

such that a change in color or fluorescence emission of the composition indicates that the target nucleic acid is present in the test sample.

70. The method of claim 69, wherein the detectable label is attached at the 3'-end of the oligonucleotide or nucleic acid.

71. The method of claim 69, wherein the detectable label is attached at the of the oligonucleotide or nucleic acid.

72. The method of claim 69, wherein the method further comprises the step of digesting the oligonucleotide probe such that the detectable label is removed from the oligonucleotide or nucleic acid.

73. The method of claim 69, wherein the step of digesting the oligonucleotide probe is effected by 5'→ 3' exonuclease activity of a polymerase enzyme.

74. The method of claim 69, comprising a doubly labeled probe including both a reporter label and a quencher label, which is digested upon hybridization to a target nucleic acid, thereby liberating one or both of the labels from the probe.

75. A method for detecting ribonuclease activity in a test sample, comprising:

a) contacting the test sample with a substrate, thereby creating a test reaction mixture, wherein said substrate comprises a nucleic acid molecule comprising:

i. a cleavage domain comprising a single stranded region, said single stranded region comprising at least one internucleotide linkage immediately 3' to an adenosine residue, at least one internucleotide linkage immediately 3' to a cytosine

residue, at least one internucleotide linkage immediately 3' to a guanosine residue, and at least one internucleotide linkage immediately 3' to a uridine residue, and wherein said cleavage domain does not comprise a deoxyribonuclease cleavable internucleotide linkage; and

ii. a detectable label of claim 35 on one side of the internucleotide linkages;

b) incubating said test reaction mixture for a time sufficient for cleavage of the substrate by a ribonuclease in the sample; and

c) determining whether a detectable signal is emitted from the test reaction mixture,

wherein emission of adetectable signal from the reaction mixture indicates that the sample contains ribonuclease activity.

76. A method for detecting ribonuclease activity in a test sample, comprising:

a) contacting the test sample with a substrate, thereby creating a test reaction mixture, wherein said substrate comprises a nucleic acid molecule comprising:

i. a cleavage domain comprising a single stranded region, said single stranded region comprising at least one internucleotide linkage immediately 3' to an adenosine residue, at least one internucleotide linkage immediately 3' to a cytosine residue, at least one internucleotide linkage immediately 3' to a guanosine residue, and at least one internucleotide linkage immediately 3' to a uridine residue, and wherein said cleavage domain does not comprise a deoxyribonuclease-cleavable internucleotide linkage; and

ii. a detectable label of claim 35 on one side of the internucleotide linkages;

b) incubating said test reaction mixture for a time sufficient for cleavage of the substrate by a ribonuclease activity in the test sample;

c) determining whether a detectable signal is emitted from the test reaction mixture;

d) contacting a control sample with the substrate, said control sample comprising a predetermined amount of ribonuclease, thereby creating a control reaction mixture;

e) incubating said control reaction mixture for a time sufficient for cleavage of the substrate by a ribonuclease in the control sample; and

f) determining whether a detectable signal is emitted from the control reaction mixture;

wherein detection of a greater signal in the test reaction mixture than in the control reaction mixture indicates that the test sample contains greater ribonuclease activity than in the control sample, and wherein detection of a lesser signal in the test reaction mixture than in the control reaction mixture indicates that the test sample contains less ribonuclease activity than in the control sample, and wherein detection of a signal in the test reaction mixture equal to that in the control reaction mixture indicates that the test sample contains the same amount of ribonuclease activity as is present in the control sample.

77. A method of detecting endonuclease activity in a test sample comprising:

a) contacting the test sample with a substrate, thereby creating a test reaction mixture, wherein said substrate comprises a nucleic acid molecule comprising a detectable label of claim 35 and a quencher;

b) incubating said test reaction mixture for a time sufficient for cleavage of the substrate by endonuclease activity in the test sample to separate said detectable label from said quencher;

c) determining whether a detectable signal is emitted from the test reaction mixture;

d) contacting a control sample with the substrate, said control sample comprising a predetermined amount of endonuclease, thereby creating a control reaction mixture;

e) incubating said control reaction mixture for a time sufficient for cleavage of the substrate by an endonuclease in the control sample; and

f) determining whether a detectable signal is emitted from the control reaction mixture;

wherein detection of a greater signal in the test reaction mixture than in the control reaction mixture indicates that the test sample contains greater

endonuclease activity than in the control sample, and wherein detection of a lesser signal in the test reaction mixture than in the control reaction mixture indicates that the test sample contains less endonuclease activity than in the control sample, and wherein detection of a signal in the test reaction mixture equal to that in the control reaction mixture indicates that the test sample contains the same amount of endonuclease activity as is present in the control sample.

78. A method of making a labeled polynucleotide comprising:

a) contacting a double or single stranded nucleotide with a terminal deoxynucleotidyl transferase under conditions suitable to afford a 3' hydroxyl terminus;

b) contacting with a compound of claim 13, under conditions suitable for the attachment of said compound to a 3' hydroxy terminus of said double or single stranded nucleotide to afford a biotin labeled polynucleotide; and

c) detecting said biotin labeled polynucleotide.

79. A kit for real time PCR assays comprising the detectable label of claim 35 a negative or positive control, a buffer, and a DNA polymerase.

80. A kit for RNase detection assays comprising the detectable label of claim 35 a negative or positive control, a buffer, and RNase-free water.